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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/235,319	01/22/1999	RICHARD M. UBOWSKI	IYENGAR8-10	4856
7590 12/01/2003 FARKAS AND MANELLI 2000 M STREET NW 7TH FLOOR WASHINGTON, DC 200363307			EXAMINER TRAN, CON P	
			ART UNIT 2644	PAPER NUMBER 13

DATE MAILED: 12/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/235,319

Applicant(s)

UBOWSKI ET AL.

Examiner

Con P. Tran

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2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/22/03 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-3,8,9,14,22-24, and 27-28** are rejected under 35 USC 103(a) as obvious over Park (5,502,217) considered with Admitted prior art, Figure 6, instant Application 09/235,319 (hereinafter, "Admission").

Park shows (Fig 3) a single echo canceller, which is reconfigurable to serve as a hybrid, or an acoustic echo canceller (col. 3, lines 50-61). In Figure 4, it is shown that the sampler 400 is switchable to sample either the transmit path (for hybrid echo cancellation) or the receive path (for acoustic echo cancellation). The switching or switched state of 400 inherently constitutes a "register" which stores the current switching state. It is also true that if sampler 400's signal source is switchable, which it is, then there would inherently be a means to control the switching state. Whether or not this is a manual switch, a digital latch controlled via a microprocessor, etc., is not disclosed, but nonetheless some such means must be present. Such means which controls the switching state of 400 is itself inherently a register.

Since the switching state of 400, and the inherent control register thereof (be that the state of 400 itself, a manual switch which controls the state of 400, or some other switched-state controlling means as discussed above) determines whether or not the echo canceller is used as a hybrid or acoustic echo canceller, and thus configures the echo canceller per se as one of a hybrid or acoustic echo canceller.

It is clear from Park that whichever path is chosen as a signal source for 400, the echo span is determined (Figs 4 and 5) and sent to the echo canceller to control it in a suitable manner to cancel the echo.

The echo canceller per se is shown as a block 301, generally connected between the transmit and receive lines.

The details of this are not shown, since the entire disclosure focusses on being able to do either hybrid or acoustic echo cancellation, it must be deemed that 301's

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input and output paths are configured appropriately in conjunction with the switching state of 400. This is what is suggested to one of ordinary skill, since the device would not be operable (or make sense) if, for example, the sampler 400 were detecting transmit path to measure the hybrid echo, but the actual echo canceller were switched or wired in the acoustic echo cancelling configuration.

However, Park does not explicitly disclose an application of switchable source 400 in wireless device; wherein the echo canceler operates as the acoustic echo canceler and the hybrid echo canceler through a common connection.

Admission teaches a cordless handset 602 includes acoustic echo canceller 606 and a base unit 604 includes hybrid echo canceller 608 (see Fig. 6, page 3, lines 15-25); wherein the echo canceler operates as the acoustic echo canceler 606 and the hybrid echo canceler 604 through a common connection (i.e., To telephone line, Admission, Figure 6) in order to optimize echo cancellation circuits (see Park, col. 2, lines 24-25).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made to have incorporated the Park teaching with a cordless telephone as taught by Admission for the purpose of optimization echo cancellation circuits as suggested by Park in column 2, lines 24-25.

Claims 1-3, and 23-24 are thus met in view of the above discussion. **Claim 8** is also met since the switching state of sampler 400 determines whether a hybrid or acoustic echo path is analyzed, and, as discussed above, the delay value or span is passed to the echo canceller, which one of ordinary skill would understand to mean that

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it is configured in conjunction with the chosen hybrid or acoustic echo cancellation task. Thus one of two modes, hybrid or acoustic, is chosen by the state of "register" 400 or its inherently-present state-control means, be that manual switch or electronic register such as a latch. **Claim 9** is clearly met since the device is clearly reconfigurable for use in hybrid or acoustic echo cancellation. **Claim 14** is met since Figure 3 of Park shows a microphone and a telephone line. The microphone output goes out on the transmit path, and thus would be selected by 400 in one mode, and the receive path is the telephone line, which would be selected by 400 in the other mode.

Claims 22, and 27-28 are met since the wireless device of Park, Admission combination is clearly "for reconfiguring" an acoustic echo canceller in cordless handset, and a hybrid echo canceller in base unit through a common connection (To telephone line, Admission, Figure 6).

4. **Claims 6,7,15,16,18,19, and 15-26** are rejected under 35 USC 103(a) as obvious over Park considered with Admitted prior art, Figure 6 (Admission), and Iyengar (5,663,955).

Capabilities of Park in view of Admission have been discussed above. Iyengar uses two separate echo cancelling filters, but he only adapts coefficients of one at a time. This is because no adaptation is permitted during double talk, and the other two states are simply far end talk or near end talk.

During near end talk, hybrid echo cancellation is needed since there is no acoustic echo at the near end which originates from the far end, but the near end speech is transmitted to the far end via the hybrid. During far end talk, acoustic echo cancellation is needed, but no net signal should be going into the hybrid since there is no near end speech, and the far end echo is cancelled by the acoustic echo canceller.

As a result, it would have been obvious to operate echo canceller of Park in view of Admission in the acoustic cancellation mode during far end talk (Fig 3 shows the acoustic echo path) and in the hybrid echo cancellation mode during near end speech.

Iyengar teaches the detection of the transmit or receive state, and setting the appropriate adaptation mode, as well as a common memory which stores coefficients of whichever mode is being adapted. It would have been obvious to one of ordinary skill at the time of filing implement a transmit/receive state detector and necessary memory and software in Park, Admission combination to thus implement the correct echo cancellation during either one of the transmit state, for the purpose of having an echo canceller which takes care of the predominant echo in both states using only one echo canceller which is effectively time shared.

Thus the language of **claims 15, and 25-26** "reconfiguring" an acoustic echo canceller in cordless handset, and a hybrid echo canceller in base unit through a common connection (i.e., To telephone line, Admission, Figure 6) is met. **Claim 16** is met since the span length is determined by Park and used to change the span of the echo canceller itself.

If, on the other hand, the system of Park, which appears to consist essentially of blocks 301 and 302 of Figure 3, were not constructed to be automatically used for transmit and receive modes in the operable sense (rapidly switching modes in step with the conversation), then it would simply have been obvious to switch it manually, and leave it in one or the other mode as desired. This certainly would have been suboptimal, which suggests that one of ordinary skill would have been motivated to set the system up to automatically reconfigure as the conversation mode switches from transmit to receive.

Regarding **claim 6**, as noted, during double talk, Iyengar indicates that adaptation should stop, otherwise divergence may occur. Thus it would have been obvious in the overall system of Park to stop tap update during double talk, and to restart tap update when double talk ceases, thus constituting an operable reconfiguration. This would have been another aspect of the overall or total needed control of a system (such as Park) which uses LMS adaptive filters to control echo. The entire control state of various such parameters as were known in adaptive echo cancellers, such as update-taps-or-not, transmit/receive mode, value of μ (see rejections *infra*), etc. would inherently have collectively constituted a "register".

Claims 18 and 19 are also met in view of the discussions above regarding tap update inhibition and echo canceller mode.

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5. **Claims 12 and 13** are rejected under 35 USC 103(a) as obvious over Park considered with Admitted prior art, Figure 6 (Admission), further considered with Velardo (5,587,998) and Danstrom (4,582,963).

Park in view of Admission does not specifically describe his echo canceller per se (i.e., the part with an FIR and an adaptive tap weight update algorithm and any pre- or post- processing). Thus one of ordinary skill would have been motivated to seek more detailed embodiments in order to supply an actual working echo canceller for Park, Admission in combination. Such embodiments would have been any know echo canceller, such as those of Danstrom or Velardo. It would have been obvious to use either one of Danstrom or Velardo's teachings for the purpose of supplying a "working", or perhaps a more advanced echo canceller for Park, Admission, Iyengar in combination.

Danstrom is a typical full-band echo canceller, whereas Velardo is clearly a subband-based echo canceller.

It would have been obvious, in fact, to supply various possible known features in any echo canceller, and to switchably select any one, or any known combination of features, for use at any time. See Duplan Corp. v. Deering Millikan, 197 USPQ 342 (see #94).

Thus in some situations, subband echo cancellation may be more suitable than full band, and thus it would have been obvious to arrange to alternately switch between the two configurations for the purpose of using the most suitable technology at any time.

Thus it would have been obvious using any known means to arrange in block 301 of Park, Admission in combination to alternately switch between various known configurations, which would have included full band or subband cancellation; this principle would also have applied to other known features of echo cancellers, such as values for μ , the span length, etc. **Claims 12 and 13** are thus met. Such a switching arrangement, even were it merely manual, would have met the language "operably reconfigurable" of **claim 13**.

6. **Claim 21** is rejected under 35 USC 103(a) as obvious over Park considered with Admitted prior art, Figure 6 (Admission), considered with Iyengar (5,663,955), further considered with Velardo (5,587,998) and Danstrom (4,582,963).

Park of the Park, Admission, Iyengar combination does not specifically describe his echo canceller per se (i.e., the part with an FIR and an adaptive tap weight update algorithm and any pre- or post- processing). Thus one of ordinary skill would have been motivated to seek more detailed embodiments in order to supply an actual working echo canceller for the Park, Admission, Iyengar combination. Such embodiments would have been any known echo canceller, such as those of Danstrom or Velardo. It would have been obvious to use either one of Danstrom or Velardo's teachings for the purpose of supplying a "working", or perhaps a more advanced echo canceller for Park, Admission, Iyengar.

Danstrom is a typical full-band echo canceller, whereas Velardo is clearly a subband-based echo canceller.

It would have been obvious, in fact, to supply various possible known features in any echo canceller, and to switchably select any one, or any known combination of features, for use at any time. See Duplan Corp. v. Deering Millikan, 197 USPQ 342 (see #94).

Thus in some situations, subband echo cancellation may be more suitable than full band, and thus it would have been obvious to arrange to alternately switch between the two configurations for the purpose of using the most suitable technology at any time.

Thus it would have been obvious using any known means to arrange in block 301 of Park to alternately switch between various known configurations, which would have included full band or subband cancellation; this principle would also have applied to other known features of echo cancellers, such as values for μ , the span length, etc. **Claim 21** is thus met. Such a switching arrangement, even were it merely manual, would have met the language "operably reconfigurable" of claim 13.

7. **Claims 10 and 11** are rejected under 35 USC 103(a) as obvious over Park considered with Admitted prior art, Figure 6 (Admission), further considered with Velardo (5,587,998) and Sih (5,687,229).

These claims refer to the features of using center clipping either in full band or subband echo canceling.

Sih teaches the known use of full band center clipping (114 of Figure 1, and his improved version with comfort noise, 164 of Fig 5), while Velardo teaches the use of subband center clipping (Fig 4, etc.)

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Use of any of these in the echo canceller 300 of Park, Admission combination in a switchable manner, be it manual or electronically controlled via microprocessor or pipeline processor (i.e., the several methods known to those of ordinary skill in the art) would have been obvious, for the purpose of making the unit suitable for many situations, as well as under the doctrine in *Duplan Corp. v. Deering Millikan*, 197 USPQ 342 (mentioned supra).

8. **Claim 20** is rejected under 35 USC 103(a) as obvious over Park considered with Admitted prior art, Figure 6 (Admission), considered Iyengar (5,663,955), further considered with Velardo (5,587,998) and Sih (5,687,229).

These claims refer to the features of using center clipping either in full band or subband echo canceling.

Sih teaches the known use of full band center clipping (114 of Figure 1, and his improved version with comfort noise, 164 of Fig 5), while Velardo teaches the use of subband center clipping (Fig 4, etc.)

Use of any of these in the echo canceller 300 of Park, Admission combination in a switchable manner, be it manual or electronically controlled via microprocessor or pipeline processor (i.e., the several methods known to those of ordinary skill in the art) would have been obvious, for the purpose of making the unit suitable for many situations, as well as under the doctrine in *Duplan Corp. v. Deering Millikan*, 197 USPQ 342 (mentioned supra).

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9. **Claims 4 and 5** are rejected under 35 USC 103(a) as obvious over Park considered with Admitted prior art, Figure 6 (Admission), further considered with Sih (5,687,229).

Sih teaches the use of variable step (μ) size, for purposes of controlling adaptation speed and stability, according to a state determined by the usual considerations, such as near end speech, far end speech, etc. Column 15, lines 43 + describe the general situation in which the LMS adaptive filter is given $\mu=1$ initially and this value is adjusted downward as ERLE rises; this leads to reasonably rapid convergence and a lower steady-state error at convergence. It would have been obvious in Park, Admission combination to implement this known method of achieving these desirable goals—otherwise, the filter convergence speed and steady state error would have been suboptimal in regard to the known standards in the art. Thus the control register state would also include the current value of μ , which would change periodically, such as when switching from hybrid to acoustic cancellation mode and vice versa, as well as during convergence in either one of those modes.

10. **Claim 17** is rejected under 35 USC 103(a) as obvious over Park considered with Admitted prior art, Figure 6 (Admission), considered with Iyengar (5,663,955), further considered with Sih (5,687,229).

Sih teaches the use of variable step (μ) size, for purposes of controlling adaptation speed and stability, according to a state determined by the usual considerations, such as near end speech, far end speech, etc. Column 15, lines 43 +

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describe the general situation in which the LMS adaptive filter is given $\mu=1$ initially and this value is adjusted downward as ERLE rises; this leads to reasonably rapid convergence and a lower steady-state error at convergence. It would have been obvious in Park, Admission combination to implement this known method of achieving these desirable goals—otherwise, the filter convergence speed and steady state error would have been suboptimal in regard to the known standards in the art. Thus the control register state would also include the current value of μ , which would change periodically, such as when switching from hybrid to acoustic cancellation mode and vice versa, as well as during convergence in either one of those modes.

Response to Arguments

11. Applicant's arguments with respect to claims 1-28 have been considered but are not persuasive.

12. In Remarks of Amendment filed on 09/22/03, Applicant raises the following issues:

“ Neither Park, AAPA, Iyengar, Velardo, Danstrom, nor Sih either alone or in combination, disclose, teach or suggest an echo canceller module that is configurable to operate as an acoustic echo canceller and a hybrid echo canceller through a common connection.”

Examiner respectfully disagrees. As presented above in the Office Action, Park in view of Admission teaches the echo canceller that operates as the acoustic echo canceller 606 and the hybrid echo canceller 604 through a common connection (i.e., To telephone line, Admission, Figure 6) in order to optimize echo cancellation circuits (see

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Park, col. 2, lines 24-25). The relationship between the references is further noted as follows: Park teaches a switchable echo canceller that would have been obvious to have applied as the acoustic echo canceller 606 and the hybrid echo canceller 604 through a common connection at the telephone line (i.e., To telephone line) as shown in Figure 6 of Admission.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Con P. Tran, whose telephone number is (703) 305-2341. The examiner can normally be reached on M - F (8:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Customer Service Office at telephone number (703) 306-0377.

cpt *CPJ*
November 25, 2003


MINSUN OH HARVEY
PRIMARY EXAMINER